

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Version 5.0 Revision Date 19.09.2012

Print Date 17.04.2014

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifiers

Product name : Phosphorus pentasulfide

Product Number : 232106
Brand : Sigma-Aldrich
Index-No. : 015-104-00-1
CAS-No. : 1314-80-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Company Ltd.
The Old Brickyard
NEW ROAD, GILLINGHAM
Dorset
SP8 4XT
UNITED KINGDOM

Telephone : +44 (0)1747 833000
Fax : +44 (0)1747 833313
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : +44 (0)1747 833100

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [EU-GHS/CLP]

Flammable solids (Category 1)
Substances, which in contact with water, emit flammable gases (Category 1)
Acute toxicity, Inhalation (Category 4)
Acute toxicity, Oral (Category 4)
Acute aquatic toxicity (Category 1)

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Highly flammable. Harmful by inhalation and if swallowed. Contact with water liberates toxic gas. Very toxic to aquatic organisms.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008 [CLP]




Pictogram



Signal word : Danger

Hazard statement(s)

H228 : Flammable solid.
H260 : In contact with water releases flammable gases which may ignite spontaneously.
H302 : Harmful if swallowed.
H332 : Harmful if inhaled.

H400	Very toxic to aquatic life.
Precautionary statement(s)	
P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P223	Keep away from any possible contact with water, because of violent reaction and possible flash fire.
P231 + P232	Handle under inert gas. Protect from moisture.
P273	Avoid release to the environment.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P422	Store contents under inert gas.
Supplemental Hazard information (EU)	
EUH029	Contact with water liberates toxic gas.
According to European Directive 67/548/EEC as amended.	
Hazard symbol(s)	  
R-phrases(s)	
R11	Highly flammable.
R20/22	Harmful by inhalation and if swallowed.
R29	Contact with water liberates toxic gas.
R50	Very toxic to aquatic organisms.
S-phrases(s)	
S61	Avoid release to the environment. Refer to special instructions/ Safety data sheets.

2.3 Other hazards

Lachrymator., Stench.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	: Phosphorus(V) sulfide
Formula	: P ₂ S ₅
Molecular Weight	: 222.27 g/mol

Component	Concentration
Phosphorus pentasulphide	
CAS-No.	1314-80-3
EC-No.	215-242-4
Index-No.	015-104-00-1

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

Cough, Shortness of breath, Headache, Nausea, Vomiting, Pulmonary edema. Effects may be delayed., Hydrogen sulfide is strongly bound to methemoglobin in a manner similar to cyanide. Toxicologically, its reaction with enzymes in the blood stream inhibits cell respiration resulting in pulmonary paralysis, sudden collapse, and death. It is recognized by its characteristic odor of "rotten eggs". The detectable, minimum perceptible odor occurs at 0.13ppm, rapid olfactory fatigue can occur at high concentrations (>100 ppm). At concentrations of 20ppm hydrogen sulfide begins acting as an irritant on the mucous membranes of the eyes and respiratory tract and increases with concentration and exposure time. Eye irritation is characterized by irritation of the conjunctiva with photophobia to keratoconjunctivitis and vesiculation of the cornea epithelium. Prolonged exposure to moderate concentrations (250ppm) may cause pulmonary edema. At concentrations over 500ppm, drowsiness, dizziness, excitement, headache, unstable gait, and other systemic symptoms occur within a few minutes. Sudden loss of consciousness without premonition, anxiety, or sense of struggle are characteristic of acute exposure at concentrations above 700ppm. At concentrations of 1000-2000ppm hydrogen sulfide is rapidly absorbed through the lung into the blood. In this range a single inhalation may cause coma and may be rapidly fatal. Initially hyperpnea occurs, followed by rapid collapse and respiratory inhibition. At higher concentrations, hydrogen sulfide exerts an immediate paralyzing effect on the respiratory centers. When concentration reaches 5000ppm, imminent death almost always results.

4.3 Indication of any immediate medical attention and special treatment needed

no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Dry powder

5.2 Special hazards arising from the substance or mixture

Sulphur oxides, Oxides of phosphorus

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Avoid breathing dust.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Never allow product to get in contact with water during storage.

7.3 Specific end uses
no data available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Phosphorus pentasulphide	1314-80-3	TWA	1 mg/m3	Europe. Indicative occupational exposure limit values
	Remarks	Indicative		
		TWA	1 mg/m3	UK. EH40 WEL - Workplace Exposure Limits
		STEL	2 mg/m3	UK. EH40 WEL - Workplace Exposure Limits

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Immersion protection

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: > 480 min

Material tested: Dermatrill® (Aldrich Z677272, Size M)

Splash protection

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: > 30 min

Material tested: Dermatrill® (Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 873000, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an Industrial Hygienist familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use

respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance	Form: powder Colour: yellow
b) Odour	Stench.
c) Odour Threshold	no data available
d) pH	no data available
e) Melting point/freezing point	Melting point/range: 280 - 284 °C - lit.
f) Initial boiling point and boiling range	514 °C at 1,013 hPa
g) Flash point	not applicable
h) Evaporation rate	no data available
i) Flammability (solid, gas)	The substance or mixture is a flammable solid with the category 1.
j) Upper/lower flammability or explosive limits	no data available
k) Vapour pressure	1 hPa at 300 °C
l) Vapour density	no data available
m) Relative density	2.09 g/mL at 25 °C
n) Water solubility	no data available
o) Partition coefficient: n-octanol/water	no data available
p) Autoignition temperature	no data available
q) Decomposition temperature	no data available
r) Viscosity	no data available
s) Explosive properties	no data available
t) Oxidizing properties	no data available

9.2 Other safety information

no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

no data available

10.2 Chemical stability

no data available

10.3 Possibility of hazardous reactions

Reacts violently with water.

10.4 Conditions to avoid

Heat, flames and sparks. Extremes of temperature and direct sunlight. Exposure to moisture.

10.5 Incompatible materials

Strong oxidizing agents, acids, Alcohols, Reacts violently with water.

10.6 Hazardous decomposition products
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - rat - 389 mg/kg

LD50 Dermal - rabbit - 3,160 mg/kg

Remarks: Prolonged skin contact may cause skin irritation and/or dermatitis.

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure

no data available

Specific target organ toxicity - repeated exposure

no data available

Aspiration hazard

no data available

Potential health effects

Inhalation	Harmful if inhaled. May cause respiratory tract irritation.
Ingestion	Harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure

Cough, Shortness of breath, Headache, Nausea, Vomiting, Pulmonary edema. Effects may be delayed., Hydrogen sulfide is strongly bound to methemoglobin in a manner similar to cyanide. Toxicologically, its reaction with enzymes in the blood stream inhibits cell respiration resulting in pulmonary paralysis, sudden collapse, and death. It is recognized by its characteristic odor of "rotten eggs". The detectable, minimum perceptible odor occurs at 0.13ppm, rapid olfactory fatigue can occur at high concentrations (>100 ppm). At concentrations of 20ppm hydrogen sulfide begins acting as an irritant on the mucous membranes of the eyes and respiratory tract and increases with concentration and exposure time. Eye irritation is characterized by irritation of the conjunctiva with photophobia to keratoconjunctivitis and vesiculation of the cornea epithelium. Prolonged exposure to moderate concentrations (250ppm) may cause pulmonary edema. At concentrations over 500ppm, drowsiness, dizziness, excitement, headache, unstable gait, and other systemic symptoms occur within a few minutes. Sudden loss of consciousness without premonition, anxiety, or sense of struggle are characteristic of acute exposure at concentrations above 700ppm. At concentrations of 1000-2000ppm hydrogen sulfide is rapidly absorbed through the lung into the blood. In this range a single inhalation may cause coma and may be rapidly fatal. Initially hyperpnea occurs, followed by rapid collapse and respiratory inhibition. At higher concentrations, hydrogen sulfide exerts an immediate paralyzing effect on the respiratory centers. When concentration reaches 5000ppm, imminent death almost always results.

12. ECOLOGICAL INFORMATION

- 12.1 Toxicity**
no data available
- 12.2 Persistence and degradability**
no data available
- 12.3 Bioaccumulative potential**
no data available
- 12.4 Mobility in soil**
no data available
- 12.5 Results of PBT and vPvB assessment**
no data available
- 12.6 Other adverse effects**
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product**

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

- 14.1 UN number**
ADR/RID: 1340 IMDG: 1340 IATA: 1340
- 14.2 UN proper shipping name**
ADR/RID: PHOSPHORUS PENTASULPHIDE
IMDG: PHOSPHORUS PENTASULPHIDE
IATA: Phosphorus pentasulphide
- 14.3 Transport hazard class(es)**
ADR/RID: 4.3 (4.1) IMDG: 4.3 (4.1) IATA: 4.3 (4.1)
- 14.4 Packaging group**
ADR/RID: II IMDG: II IATA: II
- 14.5 Environmental hazards**
ADR/RID: yes IMDG Marine pollutant: yes IATA: no
- 14.6 Special precautions for user**
no data available

15. REGULATORY INFORMATION

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

- 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
no data available
- 15.2 Chemical Safety Assessment**
no data available

16. OTHER INFORMATION**Further information**

Copyright 2012 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.
